

Appl. No : 09/727,070
Filed : November 29, 2000

claims, and not for any reasons relating to patentability. Thus Applicant respectfully submits that the scope of the Claims 1, 4, 8, and 10 has not been changed as a result of these amendments.

Rejections under 35 U.S.C. § 102

The examiner rejected Claims 1 and 3-5 under 35 U.S.C. § 102(b) as being anticipated by Munakata et al.

Applicant respectfully submits that Munakata does not teach or suggest the unique combination of features recited in Claim 1 of the above-referenced application. Applicant's Claim 1 recites, among other limitations, "wherein in the contour of the cross-section of said outermost layer, each groove comprises an arc-shaped curve having a predetermined radius R centered about a vertex of a regular polygon and each segment strand between adjoining grooves comprises a straight line or an arc-shaped curve which is concave with respect to said straight line, and there is a discontinuous point between the arc-shaped curve and the groove." Applicant respectfully submits that Munakata does not teach or suggest each segment strand between adjoining grooves having a straight line or an arc-shaped curve which is concave with respect to said straight line with a discontinuous point between the arc-shaped curve and the groove.

In contrast, Munakata teaches an overhead cable with a plurality of segment strands with a sector-shaped cross-section. The sector-shaped segment strands comprise substantially convex curves between each groove. The convex curves of the outside surface of the segment strands form circular-segment arcs as seen best in Figures 22A-22F of that reference. Figures 23G-23J of Munakata also show segment strands comprising alternating convexities between concave grooves, thus also lacking the limitations recited in Claim 1.

For at least these reasons, applicant respectfully submits that Claim 1 is not anticipated by Munakata. Furthermore, Applicant submits that independent Claims 3-5, which ultimately depend on Claim 1 and therefore include all the limitations of that base claim are also not anticipated by Munakata. For at least these reasons, Applicant respectfully requests that the rejections be withdrawn.

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Rejections under 35 U.S.C. § 103

The examiner has rejected Claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Munakata. Applicant submits that Claim 2 is dependent on Independent Claim 1 and thus includes all of the limitations contained in that base claim, and thus for the reasons discussed above with respect to Claim 1, Applicant submits that Claim 2 is patentable over Munakata. Applicant therefore respectfully requests that the rejection be withdrawn.

Allowable subject matter

Applicant notes with appreciation the Examiner's indicated allowability of the subject matter of Claims 6-11 if rewritten in independent form. Therefore, Claim 6 has been rewritten in independent form to include all the limitations of the base claims. Claims 7-11 depend from Claim 6 and therefore include all of the limitations of the base claim. Thus Applicant respectfully submits that claims 6-11 are now in condition for allowance, and such action is respectfully requested. Applicant respectfully submits that the amendment to Claim 6 was made only to rewrite that claim in independent form, and the scope of Claims 6-11 has not changed as a result.

The Examiner asserted that the reasons for the indication of allowable subject matter were: the prior art of record does not teach or suggest an overhead cable comprising a ratio H/R as recited in Claims 6-11 in combination with other features recited in the claims.

While Applicant agrees that the prior art of record does not teach or suggest an overhead cable comprising a ratio H/R as recited in Claims 6-11, Applicant submits that Claims 6-11 recite further unique combinations of features also not taught or suggested by the prior art of record.

NEW CLAIMS 12-16

As indicated above, Applicant has added new claims 12-16. Applicant submits that these new claims also include a unique combination of features not taught or suggested by Munakata. Thus, Applicant respectfully submits that these claims are in condition for allowance, and such action is respectfully requested.

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CONCLUSIONS

The Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims pursuant to statutory section 102 and 103, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. In light of these amendments and remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested.

Any claim amendments which are not specifically discussed in the above remarks are not made for patentability purposes, do not narrow the claims, and it is believed that the claims would satisfy the statutory requirements for patentability without the entry of such amendments. Rather, these amendments have only been made to increase claim readability, to improve grammar, and to reduce the time and effort required of those in the art to clearly understand the scope of the claim language. Furthermore, any new claims presented above are of course intended to avoid the prior art, but are not intended as replacements or substitutes of any cancelled claims. They are simply additional specific statements of inventive concepts described in the application as originally filed.

If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

The specific changes to the specification and the amended claims are shown on a separate set of pages attached hereto and entitled VERSION WITH MARKINGS TO SHOW CHANGES MADE, which follows the signature page of this Amendment. On this set of pages, the insertions are underlined while the ~~deletions are stricken through~~.

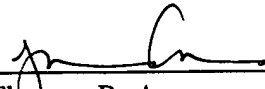
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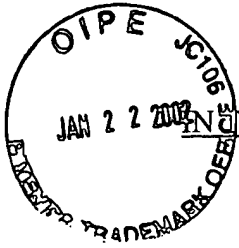
Please charge any additional fees, including any fees for additional extension of time,
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Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR,
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Dated: 1/2/02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 1, 4, 6, 8, and 10 have been amended as follows:

1. (AMENDED) An overhead cable comprising:
a tension-bearing core;
a conductive layer arranged at an outer circumference of the core; and
an outermost layer constituted by twisting together a plurality of segment strands, and having a spiral groove along the longitudinal direction in the outer circumferential surface region of each boundary portion of adjoining segment strands, wherein

in the contour of the cross-section of said outermost layer, each groove comprises an arc-shaped curve having a predetermined radius R centered about a vertex of a regular polygon and each ~~part~~ segment strand between adjoining grooves comprises a straight line or an arc-shaped curve which is concave with respect to said straight line,

and wherein there is a substantially discontinuous point between the arc-shaped curve and the groove.

4. (AMENDED) An overhead cable as set forth claim 3, wherein said arc-shaped curve is concave with respect to the straight line connecting adjoining vertexes of the regular polygon by a maximum depth D and

a ratio D/d between the maximum depth D and the diameter d of circumscribing the vertexes of the regular polygon is within a range from 0.0 to 0.018.

6. (AMENDED) An overhead cable comprising:
a tension-bearing core;
a conductive layer arranged at an outer circumference of the core; and
an outermost layer constituted by twisting together a plurality of segment strands, and having a spiral groove along the longitudinal direction in the outer

circumferential surface region of each boundary portion of adjoining segment strands,
wherein

in the contour of the cross-section of said outermost layer, each groove
comprises an arc-shaped curve having a predetermined radius R centered about a
vertex of a regular polygon and each ^{seg. str} part between adjoining grooves comprises a
straight line or an arc-shaped curve which is concave with respect to said straight line;

wherein a diameter d of a circle circumscribing the vertex of the regular
polygon is within a range from 12.8 mm to 42.6 mm;

wherein said regular polygon is made within a range from a regular 12-sided
polygon to a regular 24-sided polygon;

wherein said arc-shaped curve is concave with respect to the straight line
connecting adjoining vertexes of the regular polygon by a maximum depth D and a
ratio D/d between maximum depth D and the diameter d of circumscribing the
vertexes of the regular polygon is within a range from 0.0 to 0.018;

wherein a ratio H/d between a maximum height H from a vertex of said
regular polygon to the bottom of said groove and said diameter d is within a range
from a 0.0045 to 0.0357; and

~~An overhead cable as set forth in Claim 5,~~ wherein a ratio H/R between said
maximum height and said radius R is within a range from 0.08 to 1.0.

8. (AMENDED) An overhead cable as set forth claim 6, wherein said diameter d
is within a range from 35 mm to 38 mm, and the number of said segment strands is 20 and
said ratio ~~H/R~~ is less than 0.6.

10. (AMENDED) An overhead cable as set forth in claim 6, wherein said
diameter d is within a range from 27 mm to 29 mm, the number of said segment strands is 14,
and said ratio H/R is less than 0.02.

OVERHEAD CABLE

ABSTRACT OF THE DISCLOSURE

An overhead cable designed to reduce the wind load acting upon the overhead cable in the lower wind speed zone even in a cable having a relatively small diameter is described herein. The cable is provided with twisted steel strands 1 serving as the tension-bearing core, aluminum strands 2 serving as a conductive layer arranged at the outer circumference of the twisted steel strands 1, and an outermost layer arranged at the outer circumference of the aluminum strands 2, formed by twisting together a plurality of adjoining segment strands 3, and provided with a spiral groove Tr along the longitudinal direction in the outer circumferential surface region of each boundary portion of adjoining segment strands 3. In the contour of the cross-section of this outermost layer, each groove Tr has an arc-shaped curve having a radius R centered around a vertex Ap of the regular polygon, and each segment strand between adjoining grooves Tr has an arc-shaped curve which is concave with respect to a straight line connecting adjoining vertexes Ap of the regular polygon and intersects the arc-shaped curve having the radius R.